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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/708,159	11/08/2000	Toshiaki Yasue	JP919990097US1	1032

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EXAMINER

RUTTEN, JAMES D

ART UNIT	PAPER NUMBER
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2122

DATE MAILED: 07/17/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/708,159

Applicant(s)

YASUE ET AL.

Examiner

J. Derek Rutten

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 November 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☒ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☒ Certified copies of the priority documents have been received in Application No. 09/708,159.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other: \_\_\_\_.

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#### DETAILED ACTION

1. Claims 1-4 have been examined.

#### *Priority*

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

#### *Drawings*

3. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 130, 132, 14, 140, S118, S140, S200, S214, S220, S260, S320, and S340. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to as failing to comply with 37 CFR 1.84(l) because they are blurry and ill-defined, and the reference characters in particular do not reproduce well. A

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proposed drawing correction, or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

6. The drawings are objected to because the yes/no labels for reference number S160 in Figure 3 are inconsistent with the description on page 20, lines 11-13. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

*Specification*

7. The disclosure is objected to because of the following informalities: Certain references to elements in the drawings are incorrect. On page 25, line 19, the reference to "S234" should read --S334--. On page 26, line 27, the reference to "S328" should read --S348--.

Appropriate correction is required.

8. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Program Execution Method Using an Optimizing Just-In-Time Compiler.

9. The disclosure is objected to because of the following informalities: The notation on page 24 relating sets of variables (e.g.  $Vr \ 3 \ Vd$ ) should use proper set notation (e.g.  $Vr \cap Vd$ ).

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Appropriate correction is required.

10. The use of the trademark JAVA has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

***Claim Rejections - 35 USC § 112***

11. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

12. Claims 1-4 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The selection of “transfer points” and the motivation and benefit of moving and/or copying them or points which postdominate them is not clearly described. The specification attempts to define the term “transfer point”, but does not clearly convey the meaning (page 4 line 4, page 8 paragraph 1, page 14 line 28). The examiner has attempted to interpret the term to mean any language construct producing an assembly

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branch instruction, but it is not clear how and why these points are manipulated in the invention.

Since the scope of the claims could not be reasonably determined due to a lack of an enabling disclosure, no rejections of the claims have been made based on the prior art.

13. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

14. Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

15. Claim 1 recites the limitation "said code" in line 12. There is insufficient antecedent basis for this limitation in the claim. The examiner has interpreted this limitation to be --said recalculation code--.

16. Claim 3 recites the limitation "said obtained information" in line 25. There is insufficient antecedent basis for this limitation in the claim. The examiner has interpreted this limitation to mean --said information--.

17. Claim 4 recites the limitation "said code" in line 10. There is insufficient antecedent basis for this limitation in the claim. The examiner has interpreted this limitation to mean --said recalculation code--.

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18. Claims 1 and 4 recite the limitation “moving said transfer points for code to the top of a loop process when no problem occurs, even when said transfer points are moved to said top of said loop process” in lines 6 and 7 of claim 1 and lines 4 and 5 of claim 4.

The claimed limitation is vague and indefinite because it is not clear if the transfer points are moved twice. Since the scope of the claims could not be reasonably determined, no rejections of the claims have been made based on the prior art.

19. Claims 1 and 4 recite the limitation “copying to a location immediately preceeding said loop process, when said transfer points are located inside said loop process, a point that post-dominates said top of said loop process and said transfer points” in lines 8-10 of claim 1 and lines 6-8 of claim 4.

The claimed limitation is vague and indefinite because it is not clear what is copied to the location. Since the scope of the claims could not be reasonably determined, no rejections of the claims have been made based on the prior art.

20. Claims 1 and 4 recite the limitation “storing information for generating recalculation code for specific transfer points when the moving of said code and privatization and a common sub-expression elimination that are performed pass beyond said specific transfer points” in lines 11-13 of claim 1 and lines 9-11 of claim 4.

The claimed limitation is vague and indefinite because the structure of the sentence makes it unclear whether the privatization and common subexpression elimination are moved

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with the code, or if they are performed independent of the moving of code. The examiner is interpreting this limitation to mean -- when the optimization methods of code motion, privatization, and common subexpression elimination are performed on sections of code which are in the basic block but come after said specific transfer points, information is stored for the purpose of variable regeneration for the specific transfer points --.

### *Conclusion*

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6,170,083 to Adl-Tabatabai Ali-Reza discusses dynamic optimization using path profiling.

U.S. Patent No. 5,933,635 to Hölzle and Bak discusses dynamic deoptimization of bytecodes and the data structures used therein.

U.S. Patent No. 6,158,048 to Lueh et al discusses common subexpression elimination in bytecodes.

U.S. Patent No. 6,295,642 to Blandy discusses partial just-in-time compilation.

U.S. Patent No. 6,324,686 to Komatsu et al discusses a just-in-time compiler.

U.S. Patent No. 6,332,216 to Manjunath discusses a hybrid just-in-time compiler that only compiles selected blocks of code and interprets the rest.

U.S. Patent No. 6,412,107 to Cyran et al. discusses an optimization technique for interpreted runtime environments.



U.S. Patent No. 6,470,492 to Bala and Duesterwald discusses a just-in-time compiler which uses path profiling.

U.S. Patent No. 6,513,156 to Bak and Griesemer discusses a hybrid just-in time compiler that replaces virtual instructions with native instructions.

U.S. Patent No. 5,995,754 to Hölzle et al discusses dynamic optimization of bytecodes using path profiling.

U.S. Patent No. 5,970,249 to Hölzle and Bak discusses dynamic compilation of bytecodes during idle processor time.

U.S. Patent No. 5,202,995 to O'Brien discusses removing invariant branches from nests of loops.

"The Java HotSpot Performance Engine Architecture" discusses a just-in-time compiler that uses path profiling.

"Compiling Java Just In Time" by Cramer et al discusses just-in-time compilation issues.

"Design, implementation, and evaluation of optimizations in a just-in-time compiler" by Ishizaki et al discusses an optimizing just-in-time compiler.

"Compiler transformations for high-performance computing" by Bacon et al discusses compiler optimization techniques.

"Does 'just in time' = 'better late than never'?" by Plezbert and Cytron discusses performance issues of various classes of just-in-time compilers.

"Optimizing NET Compilers for Improved Java Performance" by Hsieh et al discusses optimization in just-in-time compilers versus static compilers.

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22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. Derek Rutten whose telephone number is (703)605-5233. The examiner can normally be reached on M-F 6:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (703)305-4552. The fax phone numbers for the organization where this application or proceeding is assigned are (703)746-7239 for regular communications and (703)746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)306-5484.

jdr  
July 9, 2003

W. ZHEN  
WEI ZHEN  
patent examiner